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criticisms of the author, and presenting new observations; M. L. Fernald publishes a final paper upon the instability of the Rochester nomenclature, being an answer to papers of Messrs. C. L. Polard, L. M. Underwood and N. L. Britton; and Charles Robertson has published a third set of observations of flower visits of oligotrophic bees.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES.

SECTION OF GEOLOGY AND MINERALOGY.

THE regular meeting of the Geological Section of the New York Academy of Sciences was held on Monday evening, November 18, with the chairman, Dr. A. A. Julien, presiding. The program of the evening was begun with the reading of a memorial of Dr. Theodore G. White by Professor James F. Kemp, who said in part:

Theodore Greely White was born in New York, August 6, 1872, and was the only child of his parents, both of whom he lost but a short time before his own death. He was graduated from the School of Mines of Columbia University in the course in geology and paleontology as Ph.B. in 1894, as M.A. in 1895 and as Ph.D. in 1898. He was appointed assistant in the department of physics in 1896 and held the position until 1900, being especially in charge of the experimental work in optics. From early boyhood Dr. White was interested in natural science, and while yet an undergraduate he began investigations both geological and botanical. His bachelor's thesis was a description of the geology of Essex and Willsboro towns on Lake Champlain, and he took up the study of the faunas of the Trenton group in the Champlain valley for his doctorate. In the end he extended these faunal studies all around the Adirondack crystalline area. He also carried on work for the New York State Museum under the direction of Dr. F. J. H. Merrill; and, in association with Professor W. O. Crosby, he described the petrographical characters of the Quincy granite. During an excursion to the seashore last summer he became exhausted while bathing in the salt water, and took a cold which developed into pneumonia and caused his death on the

7th of August, after a brief illness. Dr. White was a man of indefatigable industry and of great perseverance. He has left a large circle of sincere and devoted friends who can with difficulty reconcile themselves to his loss.

The second paper was a memorial of Professor Joseph Le Conte by Professor John J. Stevenson. A memorial of Professor Le Conte having appeared in the columns of SCIENCE, an abstract of this paper will not be given here.

The next paper was by Dr. Edmund O. Hovey and was entitled 'Notes on the Triassic and Jurassic beds of the Black Hills of South Dakota and Wyoming.' In this paper the author described, with the aid of a map and a number of lantern slides, the geological characteristics, the stratigraphic relations and the topographic features of the famous Red Valley of the Hills and its inclosing rim of Jurassic shales and sandstones; the observations being, for the most part, a result of a collecting trip made for the American Museum of Natural History during the past summer.

The closing paper was by Dr. Alexis A. Julien and was a discussion of 'Erosion by Flying Sand on the Beaches of Cape Cod.' The author said in part: The physical characters of the beach sand of Cape Cod show, in general, its recent derivation from the adjacent beds of the later Tertiary and especially from sands and gravels of Glacial age. In form the sand grains are mostly angular to subangular with but small admixture of those nearly spherical grains (for which I have proposed the term 'palæospheres') the form of which would indicate long erosion and high antiquity. In constitution the sands differ somewhat from those of the Atlantic coast to the southward, *e. g.*, of Long Island and New Jersey, particularly in a smaller content of iron-oxides and garnet. Through the continual movement of the winds over the peninsula, the sand upon the beaches and dunes is in a state of constant motion. During the frequent winter storms it is even borne along in vast quantities by aerial transport, and commonly with a violence sufficient to produce sharp attrition upon fixed solid objects.

The distribution of the sand is carried on from two directions: from the west along the south shore and from the north along the east and west sides of the 'forearm' of the Cape. The result is that the elbow tends to extend farther into the ocean, and Massachusetts Bay is a pocket steadily filling up with sand from the north. With the great fall of the tide on that coast, however, broad shoals are daily offered to sun and wind and the dried sands are constantly blown up on the highest dunes of the Cape, viz., those near Barnstable. There are ancient dunes along the coast, sometimes farther inland and even covered by forests, whose aggregation may be attributed to special violence of wind action at a remote period.

The most prominent results of the erosive action of the wind-driven sand are those pertaining to the general sculpture of headlands and summits of dunes, and the eating away of the softer layers of gravel and sand of which the bluffs along the east coast consist. The fine example of such erosion at Truro was described in detail and illustrated by means of a photograph. The recession of the face of the bluff here and everywhere from a vertical plane clearly indicates that its principal erosion is being constantly carried on by aerial rather than by marine attack. On the Cape, as elsewhere along our Atlantic coast, it is a common error to attribute the ravages on bluffs and dunes, noticed after a severe storm, too much to the incursions of the sea. A very large part of the damage has been done by the violence of the wind, reinforced by vast quantities of sand and spray lifted up and hurled continuously for hours against all opposing objects.

Other effects of the natural sand blast are shown in the pitted surfaces of small bodies strewn upon the beach, in the projecting hard minerals of the beach pebbles and in the polishing of exposed portions of bits of glass and pottery. 'Faceted pebbles' are lacking from the beaches, because there is too much motion to permit of grinding anything to a flat surface. The rapidity of the eroding action under favorable circumstances is surprising. During the great gale of November 25,

1899, one night sufficed to convert into ground-glass the window panes in the exposed sides of the life-saving station at Truro. No scratches or grooves appear in these surfaces, such as have been observed in the sand-fretted pebbles of a desert, the conditions of sand erosion on a beach tending to pit the surface rather than to produce striæ.

The least obvious, but perhaps the most important, effect of this form of erosion is upon the flying sand grains themselves by mutual attrition, minute particles not being protected from wear as they are when suspended in water. By the splitting of particles from the grains and their own final reduction to the most minute size, the production of silt is constantly in progress upon these windy beaches, and it is regularly carried away in suspension by every tide.

The papers of the evening were discussed by Professors J. J. Stevenson and R. E. Dodge and Dr. A. W. Grabau.

In response to an invitation from the chair Dr. W. S. Yeates, State geologist of Georgia, gave some account of the history of the geological survey of that State and a brief statement about the work being carried on by the present organization. Appreciative comments were made by Professors J. F. Kemp and J. J. Stevenson and Mr. G. F. Kunz.

EDMUND O. HOVEY,
Secretary.

RESEARCH CLUB OF THE UNIVERSITY OF MICHIGAN.

At a meeting of the Research Club of the University of Michigan, held November 7, 1901, the evening was taken up with the presentation of papers by Professors Rolfe and Novy.

Professor Rolfe spoke on 'The Use of Ellipsis in the Explanation of Grammatical Phenomena.'

Dr. Novy gave an account of the investigations which Dr. Freer and he had carried on during the past year. After reviewing the work hitherto done concerning the action of metals, such as gold and copper, upon bacteria, it was pointed out that the explanation of this

action as offered by Behring was insufficient, and that there was good reason for believing that such metals exerted a surface action resulting in the formation of peroxides which clearly possessed a greater germicidal action than hydrogen peroxide. The action of light upon bacteria, especially of sunlight, was discussed, and although the studies of Richardson, Dieudonné and others rendered it certain that hydrogen peroxide was formed under these conditions, nevertheless it was by no means demonstrated that this substance was the active germicidal agent. These considerations led the authors to the belief that the germicidal effect of metals and of sunlight was due to higher and more active peroxides. Accordingly a number of organic peroxides were prepared and their action on bacteria was studied. Several of these were found to be wholly inert. This was the case with acetone peroxide and dibenzoyl peroxide. On the other hand, the diacetyl and the benzoyl acetyl peroxides were found to be extremely germicidal. It was pointed out, however, that these bodies were not germicidal as such, but that in aqueous solution hydrolysis took place, resulting in the formation of acetyl hydrogen peroxide and benzoyl hydrogen peroxide respectively. The intense germicidal as well as oxidizing power of such solutions was therefore due to the products of hydrolysis.

It was pointed out that these last mentioned peroxides were capable of destroying the most resistant spores usually inside of a minute. A comparison with hydrogen peroxide showed that this substance was much more feeble in its action. In order to obtain approximately the same germicidal effects it was necessary to prepare solutions of hydrogen peroxide which contained eighty times as much active oxygen as that contained in a solution of benzoyl hydrogen peroxide. This fact was interpreted as showing that the organic peroxides exerted their germicidal action not through nascent oxygen, as is commonly held in the case of ozone and hydrogen peroxide, but rather through other means, possibly through ions. In the subsequent discussion it was pointed out that other interpretations were possible; that the oxygen liberated might possess a

higher potential energy than that from hydrogen peroxide; or that the organic peroxides might be dissociated, as in the case of alcohol, not so much into ions as into one or more active parts.

Dr. Novy also detailed at some length the investigation bearing upon the relation of the surface action of metals to the formation of benzoyl acetyl peroxide. Metals, paper and fabrics, as well as sand, originally employed by Erlenmeyer and by Nef, exert a marked favoring action which may be interpreted as due to occlusion and partial dissociation of oxygen.

FREDERICK C. NEWCOMBE,
Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis on the evening of December 2, 1901, the following subjects were presented:

Mr. J. Arthur Harris presented in abstract a paper on 'Normal and Teratological Thorns of *Gleditschia triacanthos* L.'

Professor A. S. Chessin, of Washington University, delivered an address on 'The harmony of Tone and Color.' The speaker said that although the idea is not new that colors, like tones, are subject to laws of harmony, he did not know that any systematic theory concerning this had thus far been presented, and the object of the paper was to establish such a theory. A color-scale was constructed and the properties of the intervals corresponding to those appearing in the musical scale were discussed, and the conclusion was reached that within the limit of an octave the laws of harmony in tone and color are identical.

A paper by Professor A. S. Chessin, on 'The true Potential of the Force of Gravity,' was presented and read by title, the author remarking that this was the first of a series of detailed papers bearing upon the general subject, the broad conclusions concerning which he had presented in synopsis at a recent meeting of the Academy.

A committee was elected to nominate officers for the year 1902.

WILLIAM TRELEASE,
Recording Secretary.